

forms a particularly instructive example of the case in question. If this salt be taken in an ignited state (!) (deprived of its water of crystallization), then its solubility," &c.

What, too, is the meaning of the statement on p. 83?

"Under ordinary circumstances the quantity of aqueous vapour [in the air] is much greater [than what?], but it varies with the moisture of the atmosphere."

Presumably, for "moisture" we are to read "temperature." On p. 164, in the description of the experiment of burning phosphorus in oxygen, it is recommended that "the cork closing the vessel should not fit tightly, otherwise it may fly off with the spoon." That the cork should fly off with the spoon is contrary to well-established precedent: if anything is to fly away with the spoon, it should, of course, be the dish on which the bell-jar is represented as resting. To say (p. 417) that common salt containing magnesium chloride "partially effloresces in a damp atmosphere" is opposed to fact, and was surely never so stated by Mendeléeff. Van der Waals's equation is written:

$$\left(p + \frac{a}{v^2}\right)(v - p) = R(1 - at),$$

instead of

$$\left(p + \frac{a}{v^2}\right)(v - b) = R(1 + at).$$

And on the same page we find $pv = c(1 + at)$, instead of $pv = c(1 - at)$.

Proper names are frequently wrong. Thus we have "Van der Waal" for van der Waals, "Becker" for Becher, "Brown" for Braun, "De Haen" for De Heen, "Fraunhofer" for Fraunhofer, "Personne" for Person, "Prout" for Proust, "Ray" for Rey, "Krütznach" for Kreutznach, "Wergtesgaden at Salzkammerhutte" for Berchtesgaden (which is not in the Salzkammergut).

We have taken the pains to compare the English version with the German translation of Jawein and Thillot in a number of instances where the meaning is obscure, or where statements are made which appear to be erroneous, and in no single instance is the fault to be traced to the author. We think, too, that the limitation imposed on the translator and editor by themselves has operated injuriously in another way: in cases where subsequent research should modify or supplement particular statements in the original, it was surely open to them, in the interests of knowledge, to substitute truth for error. Thus we know from the work of Winkler and Hempel the conditions under which exact determinations of oxygen by means of alkaline pyrogallol can be made; we know, too, that atmospheric ammonia and nitric acid are not by any means the main sources of the supply of nitrogen to plants; ammonium chloride is not now usually prepared by sublimation. The statement of the principle of Kjeldahl's method, given on p. 246, is inaccurate: the radicle ammonium has not been obtained, nor is the old view of the nature of the so-called "ammonium amalgam" any longer tenable, nor is there any direct proof of the existence of ammonium hydrate. Flagstone, at least in this country, is not a form of carbonate of lime: it is usually a fine-grained micaceous sandstone. The apparatus employed by Cavendish in his memorable synthesis of water in no wise resembled

that described and figured on p. 167; thanks to the symbol adopted by the publishing Society which bore his name, it seems now well-nigh impossible to get rid of the belief that the pear-shaped stoppered eudiometer was devised and used by him in the course of his investigation: as a matter of fact, the explosions were made in a simple Volta tube. With respect to the illustrations in general, we think that the majority of them could well have been spared; all of them have done duty in other works, and many of them are calculated to give an erroneous impression of the thing sought to be represented. Thus the coke-tower figured on p. 443 resembles nothing actually used; Fig. 60, which is stated to be a Davy lamp, is either a Mueseler or a Clanny lamp; Fig. 47 does not illustrate the method of preparing nitric acid employed in this country, nor does Fig. 93 represent a modern blast-furnace. The only figure of a zinc-furnace given is that of the practically obsolete *per descensum* method.

We have been constrained to point out these blemishes, not in any hypercritical spirit, but solely because of our wish that Mendeléeff's great work should have been given to English and American readers in as perfect a form as possible. The blemishes, after all, are only as the spots on the sun. It is a great boon to get the book even as it is, for no thoughtful reader can fail to be quickened and animated by its fruitful and suggestive pages.

T. E. T.

THE LIGATION OF THE GREAT ARTERIES.

A Treatise on the Ligation of the Great Arteries in continuity, with Observations on the Nature, Progress, and Treatment of Aneurism. By Charles A. Ballance, M.B., M.S. Lond., F.R.C.S., and Walter Edmunds, M.A., M.C. Cantab., F.R.C.S. (London: Macmillan and Co., 1891.)

THIS work is the result of investigations carried out by the authors during the last seven years, and contains the results of long and careful study. The authors were evidently desirous of getting to the bottom of their subject, and in their endeavours to do so, have used every method of research at their disposal.

The first chapter is devoted to a short account of hæmorrhage in man, and contains valuable statistics as to the results of the ligation of the main arteries. This part will, of course, prove of the greatest interest to the pure surgeon. The second chapter contains a paragraph on the necessity of experiments on animals for the purpose of studying the mechanism of hæmorrhage; this paragraph might well have been omitted in a book written for the professional and scientific public, who are already convinced of the necessity of pathological experiments if pathology is to make any advance at all. The greater part of this chapter, however, is full of valuable facts concerning the occurrence of the disease of arteries in animals; whilst in the third chapter the structure of arteries is described, and, in this connection, the experiments made by the authors on the longitudinal tension of arteries require special mention.

Physiological occlusion and pathological obliteration of

arteries are discussed in the next two chapters, and the authors point out that in physiological occlusion, Nature does not think it necessary to rupture the two inner coats of the artery, and that she does not divide the artery to reduce the longitudinal tension. In pathological obliterations, likewise, the rupture of the coats is by no means essential to occlusion, and, the coats not being ruptured, hæmorrhage does not occur.

In 1889, Messrs. Ballance and Sherrington published in the *Journal of Physiology* a valuable paper on the formation of scar-tissue, which has been practically re-copied into this book. The authors have made use for their experiment of Ziegler's method of placing glass-chambers under the skin of animals, and examining their contents at various intervals after their introduction. Messrs. Ballance and Sherrington have been unable to trace the development of the so-called plasma-cells from the ordinary cell-forms of blood and lymph, and incline towards the opinion that plasma-cells are derived from the connective-tissue elements, and ultimately develop into fibrous tissue.

I cannot help thinking that Ziegler's method is by no means satisfactory when the object in view is to study the formation of cicatricial tissue; for in such investigations the most important point is that all the tissues to be examined should be removed intact, and examined after fixation. It is impossible to do this with glass-plates, but satisfactory results may be obtained by introducing soft material, such as filter-paper. The surrounding tissues and the paper can then be removed, and serial sections made through the whole. The examination of preparations made in this way make it doubtful whether Messrs. Ballance and Sherrington's views are correct, and would rather lead me to believe that the plasma-cells are originally derived from leucocytes.

Messrs. Ballance and Edmunds proceed to investigate the conduct and fate of the coats and of the ligature, and it is clear that they have taken immense trouble in ascertaining, by experiments on animals, how quickly a ligature becomes absorbed after being applied. Numerous and beautifully-executed plates, show the microscopical and macroscopical appearances of ligatures made of tendon, silk, floss-silk, silkworm gut, &c., at varying intervals after their application to blood-vessels in man and animals; whilst special chapters are devoted to the ligature, of the knot, of the force used in the tying, &c. It may be noticed that the authors describe a new form of knot, which they recommend, and to which they give the name of stay-knot, whilst the old-fashioned reef-knot is entirely discarded. Moreover, the authors condemn in no uncertain terms the practice of rupturing the coats of arteries during, and the division of vessels after, ligature—points of the greatest practical importance.

The other chapters on the operation and the fate of the patient are of clinical interest chiefly; but special mention should be made of excellent chapters on supuration occurring after ligation, and on the pathology of hæmorrhage, as well as of the full account of the experimental investigations made by Messrs. Ballance and Edmunds. It is only right to mention that most of the experiments were made at the Brown Institution.

The book is beautifully printed, and profusely illustrated with 10 plates and 232 figures. It will be widely read

by all surgeons, histologists and pathologists, and forms a most valuable addition to surgical and pathological science.

M. ARMAND RUFFER.

OUR BOOK SHELF.

Precious Stones and Gems: their History, Sources, and Characteristics. By Edwin W. Streeter, F.R.G.S., M.A.I. Fifth Edition. (London: George Bell and Sons, 1892.)

BOOKS dealing with the fascinating subject of precious stones naturally fall into three classes—mineralogical treatises, archæological essays, and works adapted for experts and commercial men. Among the last class, the well-known work above cited, which has now reached a fifth edition, takes a prominent place. The enterprise and energy of the author in seeking out and developing new sources of ornamental stones is well known, and many of the facts contained in the present volume have been collected or verified by Mr. Streeter himself, by his sons, or by their agents. The chapters, which in earlier volumes were devoted to the description of famous diamonds, and to pearls and pearl-fishing, are now omitted, these subjects having been dealt with in separate books from the author's pen, the space thus obtained being devoted to an account of the Ruby Mines of Burma, the sources of sapphire in Siam and Montana, and those of the emerald in Egypt. In all these cases Mr. Streeter's agents have taken an active part in the work of exploring the districts, and he is able to furnish much information not hitherto available to the public. While the commercial aspects of these gem-stone localities naturally receive the greatest amount of attention, it is only fair to the author to point out that much care has evidently been exercised in order to prevent the creeping in of those errors on scientific points which too often disfigure works of this class. The author acknowledges in his preface the assistance which he has received from Mr. Rudler, the Curator of the Jermyn Street Museum, in dealing with scientific questions. The new edition, like its predecessors, is admirably got up and well illustrated.

Air and Water. By Vivian B. Lewes, F.I.C., F.C.S., Professor of Chemistry, Royal Naval College, Greenwich, &c. (London: Methuen and Co., 1892.)

THIS little book is one issued in connection with a series of University Extension manuals. The author may be congratulated upon the selection of his subject, which is one of those capable of being adequately treated in a course of a dozen lectures; and he has been no less happy in his treatment of it, for by following the historical method he has succeeded in maintaining the interest of his readers, while he fairly covers the whole ground with which an elementary treatise on this topic may be expected to deal. The story of the researches of Galileo, Torricelli, and Pascal, of Priestley, Cavendish, and Lavoisier, is followed by an admirable *résumé* of the latest achievements of chemical science, and this in turn by a clear statement of the problems involved in the maintenance of proper supplies of fresh air and pure water. The warmest votaries of other branches of science will not quarrel with our author when, in his enthusiasm, he declares chemistry to be the "most beautiful of the sciences"; possibly, however, some may demur to the statements in the following passage: "Although the amount of oxygen present in the air amounts to 1,233,010 billions of tons, still it is only one two-millionth of the total oxygen, and had not this small fraction been left over in the creation of the world, neither animal nor vegetable life could have existed." The author must hold very decided views as to how far down extends that condition of oxidation which is so constantly found at the earth's surface.